

AMENDMENTS

In the Claims

The following is a marked-up version of the claims with the language that is underlined (“___”) being added and the language that contains strikethrough (“—”) being deleted:

1. (Canceled)
2. (Currently Amended) the method of Claim ~~1-4~~, ~~further comprising:~~
~~inputting an input pixel value for a pixel location;~~
wherein said modulating the dot density modulates the spacing of the dot to be printed for said pixel location with respect to preceding and subsequent pixel locations and said modulating the dot size modulates the size of said dot to be printed for said pixel location.
3. (Canceled)
4. (Currently Amended) A method of halftoning an image, said method comprising:
inputting an input pixel value for a pixel location within said image;
modulating the dot density of said image; and
modulating the dot size of printed dots to obtain a printed halftone image;
wherein modulating the dot density of said image comprises controlling the dot density for said pixel location within said image using said input pixel value and performing dispersed dot halftoning to produce a dot position based on said dot density;
~~The method of Claim 3,~~ wherein said modulating the dot size of said image comprises controlling the dot size for said pixel location within an image using said input pixel value and performing dot size modulation based on said dot size and said dot position.
5. (Original) The method of Claim 4, wherein controlling the dot density for said pixel location comprises generating a dot density value based on said input pixel value, said dot density value being used to perform said dispersed dot halftoning, and wherein said

controlling the dot size for said pixel location comprises generating a dot size value based on said input pixel value, said dot size value being used to perform dot size modulation.

6. (Original) The method of Claim 5, wherein said generating a dot density value is performed using a first look up table and generating a dot size value is performed using a second look up table.

7. (Original) The method of Claim 4, wherein controlling the dot density for said pixel location and performing dispersed dot halftoning are performed in a first integrated process and controlling the dot size for said pixel location and performing dot size modulation are also performed in a second integrated process.

8. (Original) The method of Claim 4, wherein said modulating the dot size of said image further comprises diffusing at least a portion of the dot size for the pixel location to at least one subsequently processed pixel location.

9. (Currently Amended) The method of Claim ~~4~~4, wherein said modulating the dot density is performed using at least one of error diffusion, dispersed dot screening, and iterative search based halftoning.

10. (Currently Amended) The method of Claim ~~2~~9, wherein said modulating the dot density is performed using tone dependent error diffusion.

11. (Original) The method of Claim 10, further comprising:

- generating a dot density value based on said input pixel value, said dot density value being used in said tone dependent error diffusion;

- said tone dependent error diffusion, comprising:

- combining said dot density value with at least one previous error value to produce a modified pixel value;

- comparing said modified pixel value with a threshold value to produce a halftone value for said pixel location; and

- using said halftone value for said pixel location to produce an error value that is diffused to at least one subsequently processed pixel.

12. (Currently Amended) The method of Claim ~~1~~4, wherein said modulating the dot size is performed using pulse width modulation.

13. (Original) The method of Claim 12, wherein said pulse width modulation provides a first value indicating the width of the pulse and a second value indicating the justification of said pulse within a pixel location.

14. (Original) The method of Claim 13, wherein when a printed dot is larger than one pixel, the pulse within adjacent pixels are justified together so that the dot may be formed with one continuous pulse.

15. (Canceled)

16. (Currently Amended) The method of Claim ~~15~~4, wherein ~~said producing a halftone value for said pixel location also uses performing dispersed dot halftoning comprises using~~ accumulated errors diffused from at least one other pixel location and ~~provides~~providing an error for said pixel location to be diffused to at least one subsequently processed pixel location.

17. – 19. (Canceled)

20. (Currently Amended) The method of Claim ~~19~~12, wherein said pulse width modulation is performed using a look up table.

21. (Currently Amended) The method of Claim ~~15~~4, further comprising diffusing at least a portion of said dot size value for the pixel location to at least one subsequently processed pixel location.

22. (Original) A method of optimizing a dot size look-up table and a dot density look-up table for a printing system that uses dot size modulation and dot density modulation, the method comprising:

printing at least one test page showing the combinations of dot sizes and dot densities;

measuring the output absorptance for each combination and the print distortion for each combination;

determining the print distortion at each output absorptance using the measured output absorptance and the measured print distortion for each combination;

calculating the optimized dot size look-up table using the print distortion at each output absorptance; and

calculating the optimized dot density look-up table using the print distortion at each output absorptance.

23. (Original) The method of Claim 22, wherein determining the print distortion comprises:

inverting the output absorptance for each combination to compute the value of the dot density required to produce each output absorptance; and

using the inverted output absorptance and the print distortion for each combination to determine the print distortion as a function of output absorptance.

24. (Original) The method of Claim 22, wherein calculating the optimized dot size look-up table comprises minimizing a cost function of the print distortion at each output absorptance as a function of dot size.

25. (Original) The method of Claim 24, wherein calculating the optimized dot density look-up table further comprises using the calculated optimized dot size look-up table.

26. (Currently Amended) A printing system including a printer and a computer, the printing system printing a dot density and dot size modulated image, the method performed by the printing system comprising:

performing dispersed dot halftoning for a pixel location based on an input pixel value for said pixel location such that the dot density of the image is modulated;
and

performing dot size modulation for said pixel location based on ~~the results of a~~
dot size and dot position of halftoned dots determined by said dispersed dot halftoning
~~and said input pixel value.~~

27. (Original) The image forming device of Claim 26, wherein the printer is one of an electrophotographic printing device, electrophotographic copying device, and an inkjet printer.

28. (Currently Amended) An image forming system comprising:

a computer;

a printing device coupled to said computer;

a computer program executed by said computer, wherein said computer program comprises computer instructions for:

performing dispersed dot halftoning for a pixel location based on an input pixel value for said pixel location such that the dot density of the image is modulated; and

performing dot size modulation for said pixel location based on dot size and dot position of halftoned dots determined by said dispersed dot halftoning

~~receiving an image;~~

~~modulating the dot density of said image; and~~

~~modulating the dot size of printed dots to obtain a halftone for said image.~~

29. (Currently Amended) The image forming system of Claim 28, wherein:

~~receiving an image comprises receiving an input pixel value for a pixel location within said image;~~

modulating the dot density of said image comprises generating a dot density control value using said input pixel value for said pixel location and producing a halftone value for said pixel location using said dot density control value; and

~~modulating the performing dot size modulation~~ comprises generating a dot size control value using said input pixel value for said pixel location and producing a size modulated halftone value for said pixel location based on said dot size control and said halftone value.

30. (Original) The image forming system of Claim 29, wherein said producing a halftone value for said pixel location comprises adding at least a portion of accumulated errors from at least one other pixel location with said dot density control value and diffusing an error for said pixel location to at least one subsequently processed pixel location.

31. (Original) The image forming system of Claim 28, wherein said computer is a microprocessor.

32. (Original) The image forming system of Claim 28, wherein said image forming system is one of an electrophotographic printing device, electrophotographic copying device, and an inkjet printer.

33. – 38. (Canceled)